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AN INQUIRY

INTO THE CAUSES

THAT HAVE HITHERTO RETARDED THE ADVANCEMENT

OF

AGRICULTURE

IN EUROPE:

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WITH HINTS FOR REMOVING
THE
CIRCUMSTANCES THAT HAVE CHIEFLY OBSTRUCTED ITS PROGRESS.

MVSEVM BRITANNICVM

BY

JAMES ANDERSON.

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Possunt quia posse videntur.

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PREFACE.

If a man bestows a very particular degree of attention on any branch of science, he cannot fail in time to acquire a competent degree of knowledge in that science. If his application is intense, his progreſs will be at first rapid, and he will in a few years become acquainted with almost all the discoveries that have been made by others in that science. During this course of study, he will advance with pleasure; because, without any violent exertion to himself, he will feel that his mind is daily acquiring new degrees of knowledge. But if he shall still continue his pursuits, and shall endeavour to push beyond those who have gone before him, the scene is quickly changed. Instead of advancing with rapidity like a traveller in a cultivated and civilized country, he is obliged to assume the painful office of a pioneer in an unfrequented desart, thick bestrewed with rocks, thorns, impenetrable woods, and sinking morasses, which he is under the necessity of removing or of filling up before he can advance. And as this region through which he endeavours to penetrate is totally unknown, a principal difficulty with him is to discover a proper direction for that route upon which his own labour and that of others may be afterwards usefully employed. In these circumstances, it is impossible but he must sometimes mistake the proper direction, and be obliged, after much fruitleſs labour, to return to the place from whence he first set out. And being scarce able to perceive distinctly himself the route which he thinks most likely to succeed, he finds it impossible to convey any tolerable idea of it to those who attempt to follow him, on whose assistance he must rely for finishing the road he has chalked out. Sometimes, in his ventrous career, he plunges into thickets which totally conceal him from the view of his followers: sometimes he points at objects which they find it impossible to discern, and often he appears to think certain particulars of the greatest importance, which they cannot help considering as extremely trivial and uninteresting. In this manner, although he himself shall perhaps be highly entertained by the future prospects which sometimes burst open to his view in all their glory, he seldom finds it in his power to convey a lively idea of them to those who attend him; insomuch that the greatest part of these, tired with the fruitleſs labour, are pleased to return to the smooth road they left behind, and forsake such intricate and thorny paths, which they think will certainly end in fruitleſs labour and disappointed hope.

SUCH, in a great measure, must be the fate of that man who endeavours to make new discoveries in science. Objects that have not long or powerfully attracted the attention are, to the generality of men, extremely uninteresting; and it is not till after the mind has long reflected upon them that their utility comes at length to be fully discovered. New ideas require to be illustrated by new expressions; and as the words which constitute these expressions have been known before, the reader is often bewildered by not being able entirely to forget the meaning he has been accustomed to annex to them, or to bear in mind the particular idea they are now firſt made to expreſs. To render these expressions intelligible to such as will be at the pains to study them, it becomes necessary to enter into many details which often appear tiresome and unnecessary. Thus his work, although perhaps it is the fruit of much study and reflection, appears trifling and nonsensical, and is thrown aside as uſeleſs lumber.

THE author of this small tract is afraid he shall be expoſed to cenſure on account of the great ſtreſs he may ſeem to have laid upon ſome particulars that have not hitherto been accounted of ſuch material moment as he thinks them. It has been his ſtudy to avoid as much as he could that obſcurity which he is ſenſible muſt ariſe from this circumſtance: but while he views objects in a light ſo different from that in which they have been uſually conſidered, he finds it extremely difficult to convey a very clear idea of all the unobſerved circumſtances that have operated on his mind, although he has endeavoured to explain them by the moſt appoſite illuſtrations that occurred to him. He is ſenſible, however, that all who have only beſtowed a ſlight degree of attention to the practice of agriculture will find this work affectedly minute, while he is afraid that thoſe few who have ſtudied this ſcience with a long and continued degree of attention, will think he has erred on the oppoſite extreme. To diſguſt the firſt claſs of readers as little as poſsible, he has confined his obſervations to a few objects only; and theſe he could not avoid if he intended to explain at all the utility of the plan he recommends. The ſecond claſs of readers will perhaps wiſh for ſomething more complete in this walk; but this he leaves to others to accompliſh. The views of the author will be fulfilled, if the following hints ſhall ſo far attract the notice of ingenious men as to induce them either to refute the errors they ſhall think they perceive in this treatiſe, or to confirm the obſervations contained in it: as in either caſe, it will oblige them to examine the ſubject with attention.

HE HAS reaſon to believe that few perſons have an adequate idea of the very limited ſtate of our knowledge in agriculture; on which account many will probably think that this poſition ought rather to have been *proved* than *aſsumed* in the following eſsay. To have attempted this would have amused those of little experience: but there is no doubt that all who have talents for observation will themselves discover it whenever they seriously apply their minds to this study. He likewise considered it as the leſs necessary here, as he had in another work * given a specimen of the little that is known in several branches of agriculture. He had prepared some experimental essays, with a view farther to illustrate this fact, which he once meant to have published along with this track: but for private reasons he laid aside this design. He would be the leſs backward in communicating these to the public, did he find himself kept in countenance by other publications of the same kind.

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* Disquisitions, doubts, and queries relating to agriculture in the second volume of Essays relating to agriculture and rural affairs.

AN INQUIRY

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It is universally allowed, that agriculture is the most useful of all arts; and as it is an art absolutely neceſsary to the very existence of man in a state of civil society, it appears a little surprising, that it should not have been carried nearly to its ultimate degree of perfection long before the present period; nor can we help regreting, that while so much ingenuity has been exerted in bringing to maturity many other arts of leſs utility to mankind, this one should have been suffered to remain in its present imperfect state.

BUT WHEN we reflect, that true knowledge can only be attained by accurate and judicious experiments: when we contemplate the immensity of objects that require our attention in agriculture: when we advert to the difficulty of devising proper experiments for elucidating every separate article, and the length of time that is required for each of these experiments, together with the numberleſs circumstances that may affect their result, and the difficulty of attending to all these circumstances, and making proper allowance for them, our wonder is indeed abated, but our regret continues: and we cannot help earnestly wishing, that some method could be devised for facilitating experiments in agriculture, and of rendering them of more universal utility.

NO DOUBT but many experiments are made every year, in the common course of practice, by different persons, who are totally unknown to one another. But the facts obtained by means of these experiments being unconnected with others, are of very little use. They do not afford scope to the mind for exercising its reasoning faculties, for want of which these faculties are either suffered to fall asleep, and facts to paſs unobserved, or the imagination supplying the want of collateral facts, engenders fanciful and absurd theories, that tend to perplex the understanding, instead of assisting the judgment. Hence it happens that the practical farmer either obstinately adheres to his old course of practice, or becomes a bigotted theorist. Facts are either disregarded or perverted, except by the discerning few, who, with a watchful diligence, attend to their own affairs in an unenvied obscurity; and the important observations made by them are usually ſuffered to die with the man who firſt discovered them.

EVEN those experiments that are made expressly on purpose for elucidating some particular subject, are seldom attended with the beneficial consequences that might be expected from them. Men who have studied the operations of nature, and have been accustomed to make experiments on philosophical subjects, are in some measure acquainted with the difficulty of guarding againſt all the circumstances that may vary the result of an experiment, and therefore bend their attention chiefly towards the discovery of these circumstances; and often repeat, and vary their experiments, with a view to discover if the result has been affected by any fortuitous circumstances. But in agriculture the circumstances that may vary the result of an experiment are so infinitely diversified, that the most acute philosopher that ever existed would hardly be able to discover the whole of them by reasoning A PRIORI; and the life of man is too short to ſuffer him to repeat the experiments so often as to prevent every deception that may arise from this cause.

IF, THEN, experiments in agriculture, even when conducted with the greatest circumspection, and aided by the most philosophic penetration, cannot be implicitly relied upon, ¿ what dependence can be had upon experiments made by men who have never been accustomed to attend to circumstances of this kind?

THE EXPENCE that attends the making of many essential experiments in agriculture, is another inconvenience which alone would be sufficient to retard its progreſs for ages. For farmers who would be willing to execute the experiments themselves with accuracy and fidelity, are not able to defray the necessary charges; and when men of fortune attempt it, they are obliged to depend upon the fidelity of servants, who but too often abuse the confidence that is reposed in them.

FOR THESE reasons, some sensible men, who wish to promote the advancement of agriculture, have proposed, that a large experimental farm should be set apart by the state, and put under the direction of a man of known abilities and established character, who should have power to direct and superintend the necessary experiments.

NOTHING could be more plausible in idea than such an institution: nor is it perhaps possible to imagine a case in which a small part of the public money could be applied in a manner more beneficial to the community; yet there is reason to believe, that even this institution alone would not be capable of producing all the certainty that is necessary in many branches of agriculture. There is a peculiarity attending disquisitions in agriculture that seems to have been hitherto entirely disregarded, although it has more powerfully retarded the progreſs of this art than any other circumstance whatever; that is, the difficulty, if not the impossibility, of making different persons fully comprehend the result of any one experiment in agriculture, or exactly to understand the full import of any precept applied to this art (A).

FOR, AS there is such an infinite diversity of soils, and as these may be so much altered from their original state by the modes of culture they have been formerly subjected to, by the manures that may have been applied to them, and by many other circumstances that have not perhaps been hitherto observed, which may greatly vary the result of any experiment. And as we have no terms capable of expressing that great diversity of soils, differing from one another by such delicate and unobserved peculiarities, it necessarily follows, that it is impossible to rely with certainty upon any experiment where these particulars are not known or attended to. Nor is it possible to invent terms to expreſs varieties that we ourselves have never attended to; nor could we make others understand these terms, if they were invented, until *they* also were made sensible of the peculiarities these terms were employed to expreſs (B).

IN THESE circumstances, an experimenter, while he employs the very best terms his language affords, is by no means certain that any one of these terms will not convey a separate idea to every reader that shall peruse the account of the experiment he records. Thus, in the language of the farmer, there are little more than four grand divisions of soils; viz. clayey, loamy, sandy, and gravelly. And as each of these classes admits of certain obvious characteristical marks which distinguish it from all the other classes, every farmer has formed in his own mind a particular idea of each of these soils, which always presents itself to his imagination whenever any one of these classes is named. But as the diversity of these soils, for the purpose of the farmer, is inconceivably great, some of each claſs being as remarkable for their inexhaustible fertility, as others are for their insuperable sterility, although these are not perhaps distinguishable by any obvious, or to us definable peculiarity in their external appearance; and as other varieties of soil differ as much from one another in respect of other unobserved properties, it follows, that each separate farmer, when he reads of an experiment that has been made, suppose upon a clayey or a loamy soil, naturally imagines that it has been made upon such a clay or such a loam as those are with which he has been from his infancy acquainted; although it may happen that these two kinds of clay or loam differ from each other in some of their moſt essential qualities. He perhaps repeats the experiment, and finds that the result is extremely different from that of the former experimenter. He records it in the same words with the other, excepting in the contradictory result. A third person examines and compares these experiments. ¿What can he conclude? To see which of these is right, *he* also tries the experiment with all imaginable caution, and finds the result different from either. ¿What inference can he draw from all this? Precisely nothing. And the practical farmer receives equal information, as if none of these experiments had ever been made.

HENCE it happens that many experiments in agriculture, even when made with accuracy and recorded with fidelity, have been of little use in promoting the practical knowledge of the farmer; and from the same cause, books, even when written with the most faithful accuracy from the dictates of experience, are far from being of such extensive utility as might be expected. For, as a man who has practised agriculture with succeſs, naturally imagines that the particular mode of culture he has found invariably to succeed best upon his own fields, will alſo be the best for others of the same claſs, without once dreaming of peculiarities that he has never ſeen or heard of: he generalises his precepts, and describes such or such a mode of practice as the best for clayey soils, such another as most eligible for loams, and such another still for sand (c). And although it ſhould happen that these were really the very best modes of practice that could possibly have been followed with reſpect to thoſe varieties of each of these general classes of soils which had been known to him, they might not be equally proper for other varieties of the same claſs, which could not be with certainty distinguished from the first by any marks that could be given in the present state of our knowledge. Thus, even the best practical treatises are merely local; and they are attended with this peculiar inconvenience, that no person who reads them can know before he tries it, whether the practice recommended will succeed in his own soil or not: and the youthful and sanguine adventurer in agriculture, who is in general too apt to disregard the experience of those about him, relying implicitly upon the supposed superior knowledge of his favourite author, proceeds without diffidence till he feels, perhaps to his fatal experience, that he has gone too far.

FROM the same cause it also happens that the few practical farmers, who are in such circumstances as to be able to travel from home in search of knowledge, are usually much leſs benefited by it than might have been expected. Having had no opportunities of remarking any of those opposite and seemingly contradictory peculiarities of soil above alluded to in his native fields, the farmer has not perhaps the most distant idea that such a thing ever takes place in nature; but accustomed from his infancy to regard every thing as universally efficacious that operates powerfully on the soil of the district in which he was educated, he hastily judges of the propriety of every practice he sees by the effect it would have had upon a soil of the same general claſs in his native district; so that instead of acquiring knowledge from others, and that rational diffidence which is its constant attendant, he stupidly criticises from ignorance, and returns more incorrigibly vain than he set out. Or, if our traveller is but a beginner, and has formed a mean opinion of the practice in his native district, he is as naturally disposed to think that some particular practice which he finds successfully followed abroad, will certainly be the most profitable at home, if his soil appears to be of the same kind, although it may perhaps be extremely improper for him. Thus do both return little benefited by the journey they have made: nor is the science of agriculture improved in the smallest degree by their excursions.

Such are the consequences that naturally flow from our ignorance in subjects of this nature. Consequences which I have been at the greater pains to enumerate, because the circumstance which occasions them has hitherto been in a great measure overlooked by improvers in agriculture. It so seldom happens that practical farmers have an opportunity of observing these peculiarities upon their own farms, that it is in few cases suspected by them that such peculiarities do indeed exist: on which account I make no doubt but that ninety-nine out of a hundred who shall read these observations will be disposed to look upon them as the unnecessary refinements of a speculative visionary, which could have little influence on practice.

TO SATISFY these persons, however, that this is not the case, I would ask at farmers in general, if they do not find that many of the modes of practice recommended in books of agriculture would be extremely improper to be adopted on their own farms, and even on some occasions would be altogether impracticable; although these books are known to have been written by men of sense, who were real practical farmers, and who could have no interest in misleading others? I know it is common among farmers when they meet with any particulars of this nature to criticise the writers as projectors, and to condemn them as persons who say they have followed practices that never were nor could be realised;

not adverting, it would seem, that these men when they published their books acknowledged themselves as the authors, and risked their reputation among their neighbours upon their fidelity. How much more would these farmers resemble men of a liberal turn of mind and enlightened understanding, if, instead of vainly criticising others for what there is reason to suspect they do not understand, they would endeavour to investigate the causes of those peculiarities that appear to them at first view inexplicable?

TILL mankind shall turn their attention towards the discovery of those lesser peculiarities above alluded to, such as record experiments, and describe particular modes of culture, proceed nearly in the same way with a man who should live in a country whose language was so defective as to have no specific name appropriated to denote the different kinds of grain known among us, but had only a few generic terms that were equally applied to all the kinds that could be included under certain general classes. One we ſhall suppose for what we call white corn, including wheat, rye, barley, oats, *&c.* another for black grain, including beans, pease, vetches, *&c.* and perhaps a third for grasses. And if we were further to suppose that all the various kinds of grain above enumerated were cultivated in different districts of that country, although no two kinds of the same species were known in any one of these districts. In these circumstances, let us suppose that a man, who had long been employed in the culture of wheat, without having ever seen or heard of any of the other kinds of white corn, had discovered a much surer method of obtaining abundant crops of it than any of his neighbours, should be prevailed on to write a plain account of his practice, and publish it through all the provinces of that kingdom. Every farmer, it is plain, who should read the book, would of necessity imagine that the author treated only of that kind of white corn which he himself had been accustomed to rear, (as it would be distinguished by the same name). Thus one would think that the precepts referred to the culture of barley, another to the culture of oats, and a third to that of rye, *&c.* Every individual in each district but that in which the treatise was written, would loudly criticise the author, and among his own neighbours, equally ignorant as himself, would find no difficulty in pointing out the absurdities of practice recommended in that book; which could not fail to afford room for abundance of raillery and abuse. If the treatise had been written by one who lived in the district where oats alone were cultivated, the inhabitants of those districts where wheat only was known, would look upon the whole as a bundle of the most contradictory absurdities, and be disposed to treat the author, not as a visionary only, but as an impostor who pretended to have performed impossibilities, and who endeavoured to lead the unwary into the most shocking absurdities of practice, and to buoy up the inexperienced youth with vain hopes that never could be realised, and would therefore be outrageous in their clamours against him. It is thus that ignorance naturally inspires confidence, and produces unmerited abuse. ¿Need I draw the parallel between this case and that mentioned immediately before it? We need only to substitute the word *soil* instead of *grain*, and we ourselves become the nation described above. Like that nation, we have only three general terms, sand, clay, and loam, for expressing in our language all kinds of soils, each of them including under it many smaller varieties, some one of which varieties only is usually known in one district, while some other variety alone is known in another district, which gives rise to those virulent criticisms of one another, so common among farmers, and which reflects so much disgrace upon the profession of agriculture. ¿Is it not high time for us to endeavour to correct the abuses that spring from such degrees of ignorance and inaccuracy?

NOR IS it only with regard to soils that one man finds a difficulty in communicating his ideas with certainty to another, but on several other subjects we find the same deficiency of language arising from the imperfectneſs of our knowledge in agriculture. For we do not find terms adapted to expreſs with sufficient accuracy many of the lesser distinctions that take place both with regard to the animals and vegetables that demand the attention of the farmer. We have, indeed, words to expreſs different kinds of grain, as wheat, barley, oats, pease, beans, *&c.* but each of these kinds of grain admits of many varieties, which posseſs qualities extremely different from one another, that makes it much more profitable to cultivate some of these varieties on certain occasions than others, while some of the other varieties would succeed much better in other circumstances. Now, as some of these varieties are generally cultivated in one district, while others of them only are known in another, it must happen that the farmer who shall have cultivated only one sort, and describes the more successful manner of rearing it, may greatly mislead the farmer in another district, who cultivates another variety of grain that goes under the same denomination (D).

I AM not ignorant that there are some varieties of each of the kinds of grain above enumerated, that have been already remarked, and distinguished by names appropriated to each, and by other marks by which they may be easily distinguished from one another; such as barley and bear (or big), red and white, bearded and polled wheat, *&c.*: but I here allude to varieties still leſs than any of these, which cannot be distinguished from one another by any of those obvious peculiarities that are usually employed as discriminating marks of distinction, but which could be distinguished by the attentive practical farmer, were they compared accurately with one another. The zoologist finds great difficulty in distinguishing the horse from the aſs, although the eye recognises the difference betwixt them at the first glance; and in like manner many varieties of grain may be distinguished with certainty which the botanist confounds with one another.

GARDENERS have already attended to these distinctions among pease and beans, and have appropriated names to many varieties; but this has been so little attended to by practical farmers as to other kinds of grain, that they usually disregard as useleſs the few distinctions of this sort that have been already made, and therefore give themselves very little trouble to ascertain the peculiar qualities of these several varieties. Yet I can aver from experience, that from the same field sowed with two varieties of the same kind of corn, which could not have been distinguished from one another by any obvious peculiarity that could have been made intelligible by words, I have reaped double the crop from the one part that I obtained from the other; and in other circumstances the case has been exactly reversed. While these peculiarities, therefore, are not properly attended to, it is not surprising farmers should often meet with unaccountable variations in practice, and be little benefited by the experience of one another.

I MIGHT produce examples of the same degree of ambiguity arising from the limited state of our knowledge with regard to animals; but this, to avoid tediousneſs, I willingly decline. The examples above given, it is hoped, will be sufficient to convince the intelligent reader, that till some method shall be devised for effectually removing this bar to our progreſs, we may proceed for thousands of years, (as we have already done), without attaining that certainty of knowledge in agriculture as a *science* that is necessary for carrying the *art* to its ultimate degree of perfection. Till this important purpose shall be effected, those who busy themselves in making some kinds of experiments in agriculture, proceed like men who are keenly engaged in ascertaining the medical qualities of certain plants that have accidentally come in their way, without being at any pains to learn the specific names of these plants, or otherwise to distinguish them, so as that they might with certainty be known from all other plants. But until some systematic method of classing vegetables should be adopted, by which the identity of the plants should be ascertained, it would be impossible for any one to know with certainty the particular plants whose properties had been investigated by these diligent enquirers; so that their labours must be entirely uſeleſs to society. Those who read the records of these perhaps faithful, though futile experiments, are even in danger of being misled by them, as they run a risk of mistaking one plant for another, and of thus attributing qualities to it which it does not poſseſs. To guard against this danger, it is necessary to begin afreſh those very labours which another had completed. And if these new experimenters follow the same plan with their predecessors, their knowledge must in like manner be uſeleſs to others, and must be buried with themselves. Thus the science must continue stationary till this stumbling-block be removed, which if suffered to remain would frustrate all attempts at improvement to the end of time. This is so precisely similar to what takes place with regard to the practice of agriculture, that it is presumed the parallel will strike every individual as amazingly exact. For many thousand years, a great number of the inhabitants of every civilized nation on the globe have spent their whole lives in a painful set of experiments on this subject, a great number of whom have acquired during their own lives a very considerable degree of knowledge, which they find impossible to communicate to others who have not assisted in the experiments themselves.

FROM the foregoing induction it appears, that one capital branch of the science of agriculture has never yet obtained that degree of attention which its importance requires: I mean that which relates to the identifying any of those matters that may claim our attention, so as to enable us to distinguish any one of these with facility and certainty from every other substance with which there is danger of confounding it. This branch of the subject holds the same rank in agriculture that botany does in the knowledge of plants, or the method of classing animals and fossils, called zoology and mineralogy in the knowledge of animals and fossils. And although it must be acknowledged that this forms only one branch, and that only of a subsidiary rank, in the service of natural history, yet it is absolutely impossible to make any progreſs in the science without this artificial assistance. Like the letters of the alphabet, it is of no importance by itself, but is of the utmost utility in assisting the attainment of language. It resembles a road leading to a superb structure, without the help of which there would have been no possibility of approaching it, but which when once formed continues to be of the utmost utility to travellers, although it is in a great measure disregarded by them (E).

BUT, BY a strange fatality it happens, that although this is almost the only branch of the science of vegetables, animals, and minerals, that has attracted the attention of modern naturalists, it has been entirely overlooked in the science of agriculture, so that it has not there even had a beginning. It will now be of importance for us to endeavour to distinguish between this branch of the science of agriculture and the other branches of it, that we may be thus enabled to lay a sure foundation for this important system of arrangement; which will be best done by distinguishing those cases in which this mode of classification is of indispensible utility, from those in which it is not of material consequence.

WHEN we take an extensive survey of the science of agriculture, it appears that all the objects that require to be elucidated by means of experiment might be divided into four grand divisions.

THE FIRST of these may include all those experiments that are made with a view to ascertain the peculiar qualities and comparative value of plants: the effects of each in fattening, or otherwise affecting the health or value of any kind of domestic animals: the most œconomical manner of rearing or of feeding any kind of useful animal, so as best to fit it for any particular purpose: the ascertaining the comparative value of different classes of animals for any particular use, and obtaining a certain knowledge of the several excellencies and defects of the different varieties or breeds of any of the different claſſes of animals; and other facts of this nature (F).

THE SECOND claſs of experiments are thoſe which relate to the culture of particular plants upon a given ſoil; the aſcertaining with certainty the effects of different manures in varying the nature of that ſoil, and rendering it more or leſs fitted for producing any given plant, and the effect of different modes of culture as contributing more or leſs to encourage the luxuriance of any particular crop upon that ſoil. To which claſs we would alſo refer all thoſe modes of practice that tend to improve and render more valuable any particular kind of animal, or the reverſe (G).

THE THIRD claſs ſhould include all thoſe experiments that are intended to aſcertain the peculiar qualities of different varieties of ſoils, ſo as to diſtinguiſh them with accuracy and preciſion from one another; and to determine the nature and diſtinguiſhing peculiarities of the different varieties of any one claſs of plants or ſpecies of animals, ſo that the farmer may in no caſe be in danger of confounding theſe together in practice or experiment. This relates to that ſyſtem of claſſification, which I have already ſaid has hardly yet begun to be taken notice of in the ſcience of agriculture (H).

THE FOURTH claſs would conſist of a set of experiments not leſs essentially necessary for the improvement of agriculture as an œconomical *art* than any of the former, although of a secondary order to its advancement as *a science*, viz. those that relate to the facilitating any of the operations in agriculture by improvements in machinery, the proper distribution of time and labour, with other circumstances of a similar nature, to which it highly imports the practical farmer minutely to attend (1).

AFTER this minute enumeration of the objects that ought to engage the attention of an experimental farmer, we will be able to point out with precision the advantages that might result from a public experimental farm, as well as the circumstances in which it would be defective, and which would require to be supplied by some other means.

BY AN attentive consideration of these particulars it will appear that an experimental farm, although in some respects defective, would neverthelefs be attended with the most essential benefits to the public; as there are some experiments of the greatest utility which hardly admit of being perfectly ascertained unleſs it be by a public institution of this nature. Of this kind in a particular manner are all the experiments belonging to the first claſs above enumerated, which require so much attention, accuracy, time and expence to bring them to a proper conclusion, as gives no room to hope that ever they will be fully ascertained unleſs it be by the aid of such a public institution. That the reader may be convinced of this fact, I ſhall beg leave to produce one case by way of example.

LET IT, then, be required "to ascertain the peculiar qualities of any one kind of natural graſs, considered as a food for each variety of animals that could be fed upon it; the most œconomical manner of rearing this graſs for any particular purpose, whether alone or mixed with other varieties of plants; the most advantageous method of consuming it, whether green or dry, by cutting or by pasturing for every particular purpose to which it could be applied; and its comparative value in every point of view in which it can be considered, when contrasted with every other kind of plant that could be reared by the farmer?"

WHEN we contemplate the full import of this query, the field it opens appears to be so immense, that the wearied mind, like a bewildered traveller in a boundleſs waste, wanders over it without seeing any end of its labour, or knowing where it shall find repose. It would be in vain for me here to attempt to delineate *all* the circumstances that would require to be elucidated; but it is necessary that I should condescend upon a few.

THE TIME that is required for obtaining abundance of seeds for the necessary experiments is the first circumstance that would probably baffle the efforts of a private individual. Let us suppose that he obtains as many seeds the first year as are sufficient to sow one fall of ground. A second year elapses before he can reap any seeds from that. The third year he reaps the seeds. He sows them the fourth; which we will suppose are sufficient for five falls of ground. The fifth he sows other five falls with the produce of the first. The sixth he sows five falls more with the produce of the first, and twenty-five with the produce of the second; in all thirty falls. The seventh year he sows with the first and second, as above, thirty falls, and with the third twenty-five more: in all fifty-five. The eighth, with the produce of the first, second, and third, fifty-five; and with that of the fourth, a hundred and fifty: in all two hundred and five. It will be necessary that he save the seeds of this last one year more, before he can have enough for carrying on his experiments properly: so that about the tenth year he may be in a condition to begin his experiments upon that particular kind of graſs : How few private experimenters would have patience for this (K) ?

THE NEXT discouraging circumstance that would occur to a private person in this walk, would be the unavoidable trouble and expence attending these experiments. For every one of those plots in which the graſs-seeds are sown, must be weeded with greater care than is necessary for the borders of the best kept flower-garden; as the least stalk of other grasses coming up among them would mar the experiment: nor is it possible for a private person to obtain operators in almost any case, who will have accuracy for performing this task, even if the expence should not be grudged.

BUT LET us suppose all these difficulties overcome. It next becomes necessary to inclose in the most perfect manner the several plots of graſs intended for the particular experiments, so as to make the experimenter quite certain that no animal he wishes to exclude from it can get acceſs to it without his knowledge (L). This muſt likewise be effected by means of wooden rails, or some other sort of dead fence; because any hedge or tree near it would greatly affect the experiment.

THIS done, it would be necessary to set apart some plots to be cut and consumed green by each kind of domestic animal: the number of these plots, therefore, must be proportioned to the number of classes of animals that could be reared by the farmer in this country, and the extent of each plot should be sufficient to afford food for a whole season to a conſiderable number of each claſs of animals, to guard against the errors that might arise from particular temperaments. Other plots require to be cut and made into hay, in such quantities as to admit of feeding a sufficient number of animals of each species for such a length of time as would give a certainty of the effects produced. Other plots must be allotted for pasturage to different classes of animals to feed together, or succeed one another in an infinite number of varied rotations. Others must be appropriated for trying the effects of mixing this kind of graſs-seed with other plants that can be employed as food to animals, through all the variations that these will admit of; while others must be set apart for making a comparative trial of all these various experiments with each of the plants separately that admits of being reared by the farmer. But I begin to lose myself in the immensity of objects that croud upon me. To conclude, therefore, I hope the reader, who reflects on these objects, will be satisfied, that if, at the end of a hundred years continued attention and unwearied care, with a perfect command of money, and unlimited extent of soil, a satisfactory answer could be given to the above query, as much would be done as can ever be expected from any human power, even with all the advantages we have above supposed. ¿How vain is it, then, to hope that ever this can be effected by the zeal or assiduity of any private experimenter (M)?

FOR THESE reasons, although it is certain that a national experimental farm would not be capable of answering every purpose that may be required; yet it seems to be equally indisputable, that without some public inſtitution of this nature, either in Britain or some other nation, it will be altogether impossible ever to bring the art of agriculture to its ultimate degree of perfection. I cannot, therefore, too warmly recommend this matter to the attention of those in power. ¡What glory would it be for Britain to be the first nation that had ever adopted a proper plan for giving certainty to this most useful of all arts: an advantage which it never hath yet attained! ¡What lasting honour would it reflect upon the memory of that person who had put that plan in execution! ¿And at how small an expence might this be effected? A sum of money not greater than might be necessary to force a trifling paſs, or destroy a paltry town, and reduce a few hundreds of innocent persons to misery, might be sufficient to accomplish this great work, which would promote the ease and felicity of millions who are yet unborn, and render Britain renowned among all nations to the latest ages of posterity.

THE EXPERIMENTS belonging to the second and fourth classes admit of being carried on by private individuals in any situation, and could also be with great propriety performed on a public experimental farm. The practice of every farmer in his own farm is a continued series of experiments of this kind; and what we call EXPERIENCE in agriculture is usually nothing else but the general conclusions drawn from these continued experiments; which will be more or leſs perfect according to the acuteneſs and attention of every particular farmer.

AS IT appears to a superficial observer, at first sight, that the whole art of agriculture consists in rearing the best crops possible upon a given field, as was natural to expect, it has so happened, that the experiments reducible to this claſs have been almoſt the only ones that have hitherto been attended to by the farmer; and all those referable to any of the other classes have never yet obtained that degree of public notice that their importance ought naturally to have claimed. But as it is seldom that a perfect knowledge can be obtained of any one branch of science without a competent knowledge of many others, ſo neither is it possible to acquire the necessary knowledge in this art without attending to those subsidiary branches that lead towards it. The young sailor wishes only to navigate his ship properly from one port to another, and to be able to recover himself and save his ship after those disasters to which he must necessarily be exposed; but before he can do this properly, he must study the nature of numbers and proportions, which seems to have no immediate relation to the object he has in view. In like manner the farmer, who wishes to obtain a competent knowledge of his art, must attend to some accessary circumstances that do not seem at first sight of indispensible necessity, but which, if not known, will for ever retard his progreſs.

OF THIS kind, in a peculiar manner, are all those circumstances which require to be elucidated by the experiments of the third claſs above enumerated, which I have already endeavoured to show are of the most indispensible necessity if ever we hope to obtain any certainty in the knowledge of agriculture; becauſe without the knowledge of these all our other experiments must be in a great measure uſeleſs, and the language of one farmer utterly unintelligible to others, although every one will have the misfortune to think that he understands the other perfectly. It is hoped, that by bestowing a proper degree of attention to this branch of our ſubject for the future, the eighteenth century will have the honour to be distinguished from all others, by having laid the foundation of that certainty in the experimental knowledge of agriculture, for which succeeding ages will, it is hoped, so eminently excel those that are paſt.

IT WILL appear, however, by a very slight degree of attention to this subject, that an experimental farm is by no means so proper for throwing light upon this branch of our subject as upon those that have been already enumerated. For although royal munificence itself shall be exerted to the utmost extent in this way; although a very extensive spot were set apart for this national experimental farm, and although it were put under the direction of the most acute, the most attentive and assiduous experimenter, to whom the utmost latitude should be given for carrying on the experiments upon the largest scale, and for varying these without end; yet still the farm, however extensive, could contain but a small number of the vast variety of soils that may be met with, and therefore could not give scope for the experiments of the third claſs. The director himself could be intimately acquainted from experiment with only a few soils, and those who should read the record of his experiments would have their ideas still more limited, and therefore could derive little advantage from many of them, however judiciously planned or carefully executed.

AS THIS set of experiments is merely intended to discover the particulars by which different varieties of the same claſs of bodies may be distinguished from each other, and as these varieties are often met with at a great distance from other varieties of the same claſs, it becomes impossible for individuals to compare these with one another, or to have an opportunity of discovering those peculiarities which might serve to distinguish each from the others. Hence, therefore, it is only by collecting together and comparing the experiments of many farmers in different parts of the country, that a knowledge of those particulars referable to the third general claſs above named can ever be obtained (*). It therefore behoves us now to enquire what is the most proper method of obtaining the necessary information from so many individuals, who are at present scattered through all the provinces of the kingdom, or even through all the kingdoms of the earth, and totally unconnected with and unknown to one another.

IT WILL readily occur that no method can be so proper for collecting detached observations, the result of actual experience in many different parts of the country, and of communicating theſe to the public, as a periodical performance judiciouſly contrived, and executed with becoming ſpirit, caution, and fidelity. For, if ſuch a work were written and could be afforded at a moderate price, ſo as to come within the reach of farmers of every denomination, it would become the mean of uniting into one grand ſociety all the farmers of every diſtrict of the country, or even of every country in Europe, if proper means were adopted for ſecuring correſpondents, and eſtabliſhing an extenſive circulation.

IT IS perhaps impoſſible for the mind of man to contemplate any ſublunary object that would be more agreeable than the proſpect of ſuch a ſociety, compoſed of innumerable multitudes of people of all ſects, and nations, and languages, conferring together for the ſole purpoſe of improving one another in uſeful knowledge; who, forgetting thoſe little diſtinctions of rank, opinion, and party prejudice, which ſo inceſſantly tend to tear from us thoſe few enjoyments that might naturally have fallen to our ſhare, ſhould ſtrive with the moſt cordial ſympathy and brotherly affection to promote thoſe peaceful arts which may contribute to the happineſs of millions yet unborn. For, in this grand republic of farmers, every individual might freely communicate the knowledge which he had acquired, and might propose his doubts and receive instructions concerning those things in which he found himself deficient, without disclosing either his rank in life, his country, or his party connections. If any erroneous opinion should be there advanced, without regard to extraneous circumstances, which have such a tendency to influence the mind in general, it would quickly be refuted. What was doubtful would be elucidated by the discussions that would naturally result from contradictory opinions. Facts that *seemed* to oppose one another would not be hastily abandoned as fictions, but would be sifted to the bottom by inquisitive men. Judicious questions would be proposed to the opposing experimenters, while both were alive and capable of answering every query that could be proposed; by which means those essential circumstances that had been omitted in any one experiment, and from which the variation had proceeded, might often be discovered without waiting for a repetition of it. Or, if that could not in all cases be done at once, a few experiments proposed for elucidating the subject might perhaps be tried by thousands in one season; from which numerous experiments, when compared together, a degree of certainty would arise, which no single person would have obtained during the course of many years.

ON THE other hand, when any new experiment should be proposed for elucidating a doubtful point, and the benefits that would result from it were clearly pointed out, many persons would be induced to try it at once in different districts, and on a vast variety of soils; the result of all which experiments could be laid before the public about the same time, without almost any trouble to the several experimenters. Other persons, who had formerly made similar experiments, would in the mean time communicate the result of them to the public, and the reasoning that would occur in consequence of this would put the new experimenters on their guard, and make them attend to those particulars that are of capital importance. And when the whole of these experiments were produced and compared with one another, many important observations would be ſuggeſted, which would lead to still more useful enquiries. Thus, in the course of a few years, a greater number of decisive experiments might be obtained than could have been accumulated in many ages by solitary individuals.

NOR COULD any circumstance of importance be allowed to escape such a respectable society unobserved. For, as the attention of thousands would be directed towards each single experiment, it is not to be supposed that any matter of consequence would escape them all. The hints suggested by some correspondents would raise new ideas in the minds of others, and these in their turn would produce new reflections from others still. The omissions of one would be supplied by another: even the errors of correspondents would lead to important truths, by inducing others to refute them, who would also in their turn be corrected if they should fall into any mistakes.

A PERIODICAL performance of this nature would not ouly be better calculated for collecting the detached observations of practical farmers than any other mode of publication that could be devised, but it would also have a more powerful tendency to awaken a spirit of observation among all the inhabitants of the country. At present, farmers are in a great measure excluded from the literary world. Few of them read much: and they so seldom meet with instruction in books of agriculture, that *these* are perhaps leſs read by practical farmers than books of any other kind whatever. From this cause practical farmers seldom hear of the improvements that are from time to time mentioned in books. They lose the taste for writing themselves. They even, for the most part, despise those who write on the subject of their own profeſſion as idle visionaries. They thus lose the habit of arranging their ideas with precision, and their minds have no delight in investigation, and of course fall into a vacant kind of torpor; in which state few important discoveries or vigorous exertions are to be expected.

BUT IF they ſhould be induced to become members of a Georgical Society on the liberal plan above alluded to, they would at once be introduced into a society of men like themselves with whom they would freely communicate their ideas on subjects that they mutually understood, and would frequently find themselves qualified to take an interesting part in the discussion. This would naturally beget an attachment to that society, and a fondneſs for those subjects that were investigated in it: for man never deserts society, or loses reliſh for conversation, but when he feels that he is an object of leſs importance in his own eyes when in company than when alone. Society expands the heart, and softens the rougher affections. Emulation whets the talents. Opposition rouses the faculties of the soul, and draws forth every latent spark of genius. Sometimes they would be able to correct mistakes, to answer queries, or to solve doubts; and at other times they would listen in their turn to useful instructions from others. By these means a habit of accurate observation would be established among farmers in general, which would enable them to discriminate every important circumstance: and a spirit of enterprise thus created could not fail to be productive of the happiest consequences.

SUCH a performance would likewise be attended with the peculiar advantage of extracting the practical knowledge that may have been obtained by ingenious men in their quiet retreats, which would otherwise have descended with them to the grave. For, those farmers who are best qualified to instruct others have often the greatest aversion at becoming authors themselves. To write a book requires an exertion quite foreign to their ordinary course of buſineſs, and therefore they can seldom be induced to attempt a task of this nature. But such persons would be insensibly led to contribute something to a periodical performance of the nature here proposed; because they would be naturally inclined to communicate a small matter when they found themselves perfectly masters of the subject proposed: and they would find in themselves a still more irresistible propensity to correct the mistakes of those who should take upon them confidently to write upon a subject that they evidently did not fully understand, when it could be done with so much facility as would naturally result from an institution of this kind.

TO THE manifold advantages above enumerated, let it be added, that no other mode of publication has either such a tendency to command the attention of the reader, or to correct the faults of the writer. When a man peruses an ordinary didactic book, he reads it like a long oration that does not capitally engage his attention, and leaves but a transient impression after it is finished: but a periodical work, conducted in the manner here alluded to, like an important subject debated VIVA VOCE in a society of ingenious men, rouses all the faculties, and fixes the topics discussed much more powerfully on the memory than any other mode of discussion; especially if the reader chances to be an occasional correspondent in that performance.

BUT IF this mode of publication has some tendency to command the attention of the reader, it has a still greater tendency to correct the imperfections of an author: on which account it is the only proper method of treating a subject that is as yet but imperfectly known. For, as in an oration delivered from the pulpit it is not decent to interrupt the speaker when he may accidently fall into a mistake, so neither is it an easy matter for a reader to select the several passages from a long didactic performance which he may perceive to be erroneous, or about which he may be doubtful. The book, like the oration, must be heard to an end; before which time many passages that made a strong impression in the reading are effaced from the memory, and errors are suffered to paſs unobserved, which must have a natural tendency to mislead the ignorant. Even, if any one, in spite of these circumstances, should resolve to refute a faulty didactic performance, it still continues, like an injudicious oration after delivery, to do hurt to many; because numbers have heard the oration, or read the performance, who will never have an opportunity of seeing its refutation. But, in a periodical work, this can hardly ever be the case: for, as the several persons who shall write in it must successively appear before the same set of readers, an erroneous opinion is no sooner refuted than the knowledge of that refutation is conveyed to all who have been in danger of being misled by the error. And as every reader can with the utmost facility communicate his observations to the public, no erroneous opinion can be supposed to remain long undetected. A writer in these circumstances is, therefore, under the strongest temptation to be at all times strictly on his guard; and the reader has always a standing counsel hired at a small expence to prevent him from being deceived by specious arguments, and to guard him from being led into capital errors: an advantage of the highest importance to a young beginner in an art which is as yet so imperfectly known as agriculture is; and in which, capital errors in practice are often productive of the most mischievous consequences.

FOR THESE, and many other reasons that might be urged, the author of this essay has long thought that a periodical work on agriculture, if conducted with judgment and discretion, would be one of the most useful performances that could be offered to the public. But as the conducting of such a performance would be attended with no little care and drudgery, he greatly doubts if a person properly qualified for the task could be found, who would be willing to undertake it. For unleſs it were conducted by a man not only eminent for his judgment and knowledge in that art, but for his assiduity and strict fidelity, so as to obtain a character with the public that raised him high above the smallest suspicion of doubt, the end of such an institution could not be effectually answered, and it had better never be attempted(o) In hopes that *such* a man may perhaps be found in some future period, he begs leave to suggest a few particulars that occur as necessary to give that work the requisite degree of perfection.

PLAN OF

A

PERIODICAL WORK ON AGRICULTURE.

I.

THIS WORK should be published regularly once a-month, upon the   day of that month, and might be intituled, The GEORGICAL REPOSITORY, or RURAL INTELLIGENCER: or some other name of the same general import.

II.

ALTHOUGH care should be taken to make the ſeveral numbers as nearly as possible of an equal size, yet, as original matter might be at some times more abundant than at others, to prevent the author from being under any temptation of disgusting his readers by protracting some matters beyond their proper bounds, or of curtailing others so as to maim them; and that he might not be obliged to reject any paper of importance for want of room, or to admit trifling articles to fill up a page, it would be highly proper that he should reserve to himself a discretionary power of augmenting or diminishing the size of each number as he should see fit, so as that no number should contain leſs than sheets, nor more than unleſs upon extraordinary emergencies.

III.

THE PRICE of each number, if purchased separately, should always be in proportion to the number of sheets it contained, viz. *per* sheet, including plates. But to prevent the confusion that might arise from such a diversity of price between the different numbers, the price to the subscribers should be regulated by the volume; each volume consisting of sheets, at the price of

IV.

IT WOULD be proper to give plates where they are necessary for illustrating the subject treated of, which should be engraven with the utmost neatneſs and accuracy.

V.

AS TO the matter. It should embrace every object that has any relation to agriculture or rural œconomies, and should be confined entirely to the subjects that come under this denomination.

VI.

ALTHOUGH the author ought to exert himself to the utmost to render the work as complete as possible, and therefore should be prepared to furnish original articles himself; yet it is to be hoped that in time he would become little more than the editor of works communicated by others. With this view, it ought to be his principal study to direct the attention of the public towards such objects as promise to be of the greatest general utility, and to propose such doubts and queries as may lead to interesting discussions.

VII.

TO EFFECTUATE this in the most perfect manner, it would be proper, towards the beginning of the work, to give a succinct history of agriculture both ancient and modern. In the first part of this history, little more would be neceſsary than briefly to characterise the several ancient writers whose works have been handed down to us, and to specify the matters that have been first described, or best elucidated by each, that the curious reader might know where to apply for any information he should want when he wished to investigate a particular subject with a more than ordinary degree of accuracy.

IN THE second part, he ſhould be at pains to deſcribe the firſt dawnings of agriculture on the revival of letters in Europe: to trace its infant steps: to point out the ſeveral improvements that have been ſucceſsively adopted in different countries; and to follow its progreſs through all the migrations made from one country to another. Through the whole of this detail, care ſhould be taken to give as diſtinct a character as could be obtained of the ſeveral authors who have written on rural affairs, as they have ſucceſſively appeared: to trace, if poſſible, the ſources from whence they derived their information: to point out the firſt appearance of every new improvement, whether in theory or practice; and to diſtinguiſh original authors from thoſe that were mere compilers..

BY PURSUING this plan, the reader would be gradually conducted to the preſent period: and if the work had been properly executed thus far, the author would have little difficulty to cloſe this branch of his ſubject with a diſtinct view of the preſent ſtate of our knowledge in agriculture; which would ſerve as a proper introduction to the next grand object of enquiry.

VIII.

THE AUTHOR should then take an extensive survey of all those objects that can in any case claim the attention of the rural œconomist; each of which he should view in every possible light, and endeavour to point out all the circumstances relating to it that are of importance to be known. He ought also to ascertain which of these circumstances have been already fully explained, or in what cases they have only been in part discovered; and examine the opinions that most generally prevail with regard to any of these objects; carefully distinguishing between those notions, which having been hastily adopted at first, have at length come to be generally admitted as truths, though referable to the head of vulgar errors, and such as have been founded on actual experience and careful observation. He should then describe the attempts that have been made for attaining a farther degree of knowledge on any particular branch of agriculture, and point out the cases in which these attempts have been successful, as well as those in which they have failed, and explain the reasons of these peculiarities. The whole discussion should conclude with a set of hints and queries relating to each separate article, tending to direct the attention of diligent enquirers towards those particulars that it would be of greatest importance to have fully ascertained. This would form a most important part of the publication proposed, if it should be executed in a masterly manner; as it would naturally direct the several correspondents to the most important discussions. And if these particulars were examined in detail, it would afford a perpetual fund of new speculations, which, by different correspondents, would come to be discussed as they successively aroſe.

IX.

AS THE utility of a performance of the kind here proposed would in a great measure be proportioned to the extent of its circulation, every proper method that could be devised for rendering that circulation as universal as possible ought to be adopted. On this account it should be conducted by a man of known abilities and integrity, in whom the public could place entire confidence, who ſhould honestly acknowledge the work for his own, and risk his reputation with the public on the fidelity with which it should be executed. Periodical publications have of late been so much degraded, by having been conducted by false pretenders to knowledge, and the public has been so often abused by anonymous authors in this way, that this precaution, becomes absolutely necessary, in order to raise it in the public opinion far above the swarms of ephemeric productions that are daily issuing from the preſs.

WITH this view, likewise, the author ought to endeavour to obtain an extensive and respectable correspondence, not only in Britain and her extended colonies, but even, if possible, in every civilized country on the globe. For, as agriculture is alike useful to all nations, and as different kingdoms, as well as separate districts, may sometimes cultivate one branch of it to a higher degree of perfection than is known in any other (P), the more extensive the ſphere of correspondence, the greater chance there would be that nothing would be omitted, and that the general knowledge of the art would be more quickly attained and universally disseminated. By means of such an extensive correspondence too, the nature of the several products peculiar to each country would become universally known, and the means of introducing such of them into this countryas should be judged beneficial for it, would be greatly facilitated (Q).

THIS beneficial design would be promoted in the highest possible degree, if the author should obtain the patronage of some noble personage, whose recommen-

M

dation might so far obtain the notice of the public, and of some of the potentates of Europe, as to induce them to appoint a select number of their judicious subjects to correspond with him, with a view mutually to assist one another in elucidating this subject. By this means, an amicable society might be established among all European nations, which, even amidst the tumults of war would maintain a friendly correspondence for the general good of mankind, and thus in some measure help to repair the injuries done to the human race by ambition and the cruel arts of destruction. To be able with a word to do as much service to mankind, by countenancing useful undertakings, as would require the unceasing labour of private individuals for ages to accomplish, is the most amiable prerogative of royalty and elevated rank. ¡ What a mortifying prospect to humanity to see that powerful influence so often exerted to destroy, and so seldom to save mankind!

X.

AS THE author of such a work would thus risk his own reputation on the value of his performance, it would be reasonable that his correspondents should comply with some conditions that would neither be burdensome nor oppressive, to prevent him from suffering in their stead. It is imagined the following rules would be readily assented to as reaſonable.

1*ſt*. EVERY performance that was judged worthy of admission should be printed with the text unmutilated unleſs where permission was given to do otherwiſe: but it should be preceded or accompanied with such remarks as the editor should think necessary for more effectually elucidating the subject treated of.

2*dly*, THEORIES of agriculture, if admitted with extreme caution, and accompanied with judicious remarks, tending to point out their defects, would be of great use: for although it must be a long time before any thing perfect in that way could be expected, yet it would be an agreeable exercise for the mind of such as wished to speculate a little in that way. And as nothing is more easy than to form plausible though fallacious theories of agriculture, every farmer has adopted for himself some theoretical principles, which influence his practice and reaſoning in a very high degree. And as ordinary farmers, who are not accustomed to investigate matters with great precision, are not able of themselves to discover the fallacy of their several theories, they usually are entirely satisfied with them, as being perfectly just in every respect. It would therefore be a great point gained, to destroy in their minds that exceeding high reverence they entertain for their own theoretical opinions, and as it would not fail but that they would be highly pleased with some of those ingenious theories that would thus be subjected to their examination, when they afterwards saw them clearly refuted, it would tend to inspire them with some degree of diffidence as to matters of this kind, and gradually accustom them to a close and consistent manner of reasoning, which would be the most effectual preservative against errors both in theory and practice. For these reasons, theoretical disquisitions, introduced at proper times, would form a most useful part of a performance of the kind here proposed. But in this department the editor would need to proceed with the utmost circumspection, and be continually on his guard to reject every disquisition in this line that was not extremely ingenious, at the same time that he should be prepared to expose every fallacious argument with equal ingenuity and strength of reasoning.

3dly, IT OUGHT to be a maxim never to be departed from, that every chain of reasoning that rests upon facts furnished by the experience of any correspondent, should be subscribed by the real name of its author. This is a circumstance which it is believed would seldom be deemed a hardship; as a man is in general readily disposed to acknowledge what he is conscious will bear the strictest examination, and be found worthy of praise. But if any correspondent should scruple to have his name divulged in this manner, it might be concealed from the public, if so desired; the editor himself being first satisfied of the propriety of it. It is highly expedient however, that the author of the miscellany himself should know the real writer of every such paper, not only to enable him to pledge himself to his readers that facts are on no occasion assumed at pleasure, but also to give him an opportunity, in the several tours through the country that he might make in the course of his studies, to examine these particulars on the spot, and to make what use of them afterwards his reaſon might suggest.

THESE few rules, strictly adhered to, would serve to inspire his readers with a confidence in the publication, and prevent his correspondents from being disobliged at necessary freedoms, or from hurting the reputation of the editor by imposing on the public.

XI.

ALTHOUGH, upon the plan here chalked out, it is probable that the editor would always be furnished with abundant original matter, yet he ought not to restrict himself from copying or abridging such parts of other performances as might be new and interesting; especially from foreign publications, which have often the merit of novelty to English readers.

XII.

AND THAT the reader might receive information from this work alone, of every thing that it imported him to know relating to rural affairs, every new book on that subject should be reviewed as it successively appeared either in Britain or any other nation.

IT WOULD not be necessary in this department to criticise the style of the several authors, or take notice of other minutiæ of secondary importance: a brief analysis of the work should be given, so as to point out, in as succinct a manner as possible, the nature of the subjects treated of; and in an especial manner to particularise all new discoveries, that thus the readers of this publication should never remain long ignorant of any new improvement that had been adopted in any part of the globe.

AS TO foreign publications, the first book reviewed in any foreign language should be introduced with a particular account of the present state of agriculture in the country whose practice it relates. The particular bars that have retarded its progreſs there, or the favourable circumstances that may have promoted its improvement, should be taken notice of; and particular care should be taken to set in a conspicuous point of view those efforts that shall have been lately made for that purpose. Here it would be proper to give an account of the institution of the several public societies that have at any time been established in these countries for promoting the knowledge of rural affairs: and if these societies publish transactions, their several publications should be accurately reviewed as they are published. Thus would the reader be made acquainted, not only with the state of his own country, but with that of foreign nations, and be enabled with pleasure to revise their respective publications.

XIII.

THAT nothing might be omitted that relates to the subject of this publication, a department ought to be assigned for Georgical news, which should comprehend the several prize-questions of the different societies abroad, as well as a list of the premiums offered by the Society in the Strand, London, with the answers to these questions where they can be obtained, and the names of the gainers of the several premiums. The inventions approved of by the Society in the Strand: by the French Academy, or by any other society that may afterwards arise, should here also find a place: and here also should be given an account of the several men who should be eminent for promoting rural arts in any part of the world, as soon after the decease of these several persons as proper intelligence could be obtained.

* * *

SUCH are the outlines of the plan of a work, which, if executed by a person of knowledge, experience and integrity, properly supported by the public, would (I have no hesitation in affirming it) form a memorable epoch in the history of literature and of civil society.

NOTES

AND

ILLUSTRATIONS.

A.

(This note refers to page fifth.)

Some readers may perhaps be at a loſs to understand the full import of the paragraph in the text to which this note refers, as few have had opportunities of remarking the peculiarities here alluded to. The following facts are selected from a great many others of the same kind by way of illustrations.

TWO SOILS not distinguishable from one another in any obvious particular, but lying in different districts, were fallowed with equal care, and each dressed with horn-shavings in the ſame proportion: the one was rendered extremely fertile for many years following in consequence of that dressing; the other field did not receive the smallest benefit from it.

TWO OTHER fields at a distance from one another, and not seemingly of very different qualities, were fallowed with equal care. One of them had been exhausted by frequent crops of corn, so as to be rendered almost unfit for carrying grain of any sort; the other had been in graſs for some years, and had only carried one crop to help to rot the sward. The first field, after the fallow, without any manure at all, was sowed, a part of it with oats, and another part with barley; both of them exceeding weighty crops. The other field also, without any manure, was sowed with oats,—but hardly gave two returns of the seed.

ANOTHER field of a deep rich loamy soil, that had been in tillage for many years, and with the assistance of frequently manuring it, had carried many good crops of oats and barley, was fallowed: got a good dressing of dung, and was sowed with wheat. A few grains sprung up, but soon turned sickly, and died away. It was suffered to remain untouched till the month of July, but not one stalk of wheat ever again made its appearance. It was then turned down and prepared for another crop.

ANOTHER part of the same field that had been limed about seven years before, and was dressed in every other respect alike with the part above mentioned, yielded a very good crop of wheat *.

ANOTHER field that appeared to be a good loam, of a tendency towards clay, and was imagined to be an exceeding rich and valuable soil by three skilful farmers who came at different times from different distant parts of the country, was fallowed two years successively; the second year it received a complete dressing of dung, (upwards of sixty cart-loads, as much as two stout horses could draw, *per* acre), and was sowed with turnips drilled, and horse-hoed:—a fine crop. Next year it was sowed with oats: produce about five bolls (30 bushels) *per* acre. Next year it was sowed with oats, (it was known that no other kind of grain would grow in it at all): produce hardly two bolls (12 bushels) *per* acre. It was then fallowed a second time: got another complete dressing of dung, and was put into turnips, which were a good crop, as before. Next year oats: produce about three bolls (18 bushels) *per* acre. With this crop it was laid out for graſs. A part of it was sown with rye-graſs and clover; another part of it with sweepings of a hay-loft, consisting chiefly of feather-graſs and narrow-leaved plantain, or rib-graſs; and a part of it was left to

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* See Essays relating to agriculture and rural affairs, Vol. I. Essay vi. part 2. § 21.

run to graſs without sowing at all. A few dwarfish stalks of the rye-graſs, and of the feather-graſs, appeared the first year; but not a stalk of clover either red or white, nor of the rib-graſs. In a few years the small bent-graſs established itself over the whole field; but the whole produce of it in graſs in either state was not worth more than a shilling *per* acre. Yet this was a soil that skilful farmers esteemed a good one, who would have approved of this mode of managing it: and it is a soil that with a mode of management proper for itself may be made a very good one *.

B.

(This note refers to page ſixth.)

THERE is a kind of nicety in distinguishing objects from one another that men often acquire by long habit, the knowledge of which cannot be conveyed to another by words. Hence it happens, that although a particular person ſhould by long and attentive observation have acquired the power of distinguishing at the first glance of his eye, two different soils that bore a perfect resemblance to one another except in some very delicate peculiarities, he could not by any words convey an accurate idea of these peculiarities to another who had not himself previously observed them. Every practical farmer must have experienced this in a certain degree: for when he has been travelling with a person who has not been accustomed with rural affairs, he must have remarked, that on many occasions when he himself perceived, at the first glance of his eye, a striking difference in the state of two fields as to the perfectneſs of their culture at the time, they appeared the same in every reſpect to his fellow-traveller.

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* See Essays relating to agriculture and rural affairs, Vol. II. Diſquiſitions 40, 41, and 42, where more examples of a similar nature are produced.

THIS is no more than what happens in almost every art. The experienced jeweller can distinguish readily a precious stone from a counterfeit, although to another person they appear exactly alike. The mariner knows at the first glance one ship from another, and could distinguish each individual ship from all the others in a large squadron, while to the inexperienced landman they appear so much alike, as to be easily confounded with one another. The shepherd knows each sheep in his flock. The officer knows each individual of his men with the utmost facility; and the Guinea trader finds no difficulty in picking out a particular naked black from among a hundred, although, to a person who had not been accustomed to see very often a flock of sheep, or a regiment of soldiers in their uniforms, or many blacks uniformly naked, finds it next to impossible to call his attention from the general points in which they all resemble one another, to observe the nicer particulars that serve to discriminate individuals.

BUT ALTHOUGH long custom hath rendered the countenance of man so familiar to us, as to admit of our attending at the first to the lesser differences that always serve to distinguish one face from another, so as to be able readily to recognise any person whom we have once seen and particularly attended to, yet no words could be invented to describe a person so particularly as to make another, who had never seen that person, be certain of knowing him at first sight. Equally difficult would it be for one man to convey to another an idea of any particular soil he had never seen; even supposing both parties had been so perfectly acquainted with this subject as to have been able to perceive the nicer discriminating peculiarities at sight, so as to know it from every other soil whatever.

C.

(This note refers to page eighth.)

SEE THE complete English Farmer, and almost every other general treatise of agriculture. Ellis is almost the only author who has limited his precepts to a particular variety of a general claſs of soils; on which account his works may perhaps be of very great utility to those of the district in which he lived, but they are leſs generally interesting than many other performances that do not poſseſs a hundredth part of their merit.

D.

(This note refers to page fourteenth.)

I FIND myself so often at a loſs for proper illustrations of my meaning, when treating of peculiarities which have been so little attended to as those I have occasion here to mention, that I am obliged on some occasions to take a very wide circuit to convey the necessary information.

THE POTATOE is a plant that is now very universally cultivated, the varieties of which are so numerous, and the peculiar qualities of the several varieties are so extremely different from one another as to furnish a very proper subject for illustrating the position assumed in the text: yet, so few are acquainted with the names and peculiarities of the several varieties, as gives great reason to suspect that what might be written of one of these varieties which happened to be generally cultivated in one part of the country would not be applicable to another variety in another part of it; even although both should be distinguished from other varieties by the same name, and come under the same general description. I give an example.

ABOUT twenty years ago, the only white potatoe known or cultivated in Scotland, was of the viscous kind, of a kidney shape. It was at first called simply the *white* potatoe; but as other kinds of white potatoes came to be known, it was distinguished by the additional epithet, kidney: being long known by the name of *white kidney* potatoe. But about five or six years ago another sort of *white kidney* potatoe was first introduced into Aberdeenshire, which, although agreeing with the first in shape, in colour, and in name, was extremely different in many of its most essential qualities. The old was a viscous gluey bulb: the new was the driest and moſt mealy potatoe that ever was known. The old sent its bulbs deep into the ground, which straggled to a great distance from the stem, so that it required an uncommonly deep soil for rearing it; and a complete trenching was necessary before it could be properly taken out of the ground: the bulbs of the new rise to the very surface of the ground, so as to thrive upon a very thin soil, and ramble so little from the stem as to admit of being taken out of the ground with the utmost ease; as a good large spade is capable of lifting up the whole cluster at once. And finally, the old was an exceeding bad bearer, and therefore in general an unprofitable kind; but the new is very fertile, and the most profitable sort that has ever been known in that district.

NOW LET us suppose that the last kind had been known many years ago, and universally cultivated in a distant part of the country, where the first kind (now distinguished by the name of the *Scots white kidney* potatoe) had never been heard of: and that an author in that country, contenting himself with announcing it by its general name of white kidney potatoe, should have given an account of the produce and profits of it, and described the mode of culture that was found to suit it well. ¿Is it not evident, that the inhabitants of Scotland, who knew the first kind of white kidney potatoe perfectly well, would have been entirely satisfied that they understood the author? and finding that what he said of it did not at all tally with their own experience, they would naturally have concluded, that he was either ignorant, or an impostor. In a case of this kind, where both parties imagine they understand what is expressed by the general terms, it never comes into their head either to give or to require an accurate circumstantial description that would prevent the possibility of a mistake: nor is it perhaps possible to do this, if they were desirous of it. ¿Who does not perceive that circumstances of this kind may be the source of much embarrassment, and of great misunderstanding between different persons?

E.

(This note refers to page eighteenth.)

THE READER will please to observe, that although different kinds of earth have been distinguished from one another by certain characteristics, these divisions only relate to the science of natural history: and in the same manner the different vegetables have been systematically arranged by the botanist. Yet none of these divisions suit the purpose of the farmer. The science of agriculture is interested in those distinctions that arise from the latent qualities, if I may use that obsolete expression, which are only incidentally connected with those external marks of distinction that systematists employ; and therefore the farmer must endeavour to invent a new mode of arrangement for his own use totally different from these. Nor is he in this respect in a situation different from those who practise other arts. The naturalist, by which is meant the man who arranges bodies into certain general classes according to their external characteristics, views the same bodies in a very different light from the chemist, who regarding only their internal qualities, makes distinctions that were entirely disregarded by the former.

F.

(This note refers to page twentieth.)

EXPERIMENTS referable to this claſs are, for reasons that shall be afterwards explained, extremely few: and as authors who write chiefly with a view to please their readers, for the moſt part endeavour to conceal thoſe particulars they cannot explain, it has happened that few obſervations relating to it occur in books of agriculture, inſomuch that it has been almoſt entirely loſt ſight of both by ſpeculative and practical farmers. A great part of the diſquiſitions, doubts, and queries that occur in the ſecond volume of Eſſays relating to agriculture and rural affairs, relate to this head; by attending to which the reader will obtain a more complete idea of the importance of this claſs of experiments, and the deficiency of our knowledge with regard to it, than could be conveyed in this ſhort eſſay.

G.

(This note refers to page twentieth.)

THE GREATEST part of the treatiſes on agriculture that have been publiſhed in every part of Europe, relate merely to that branch of the experiments referable to this claſs, which is mentioned in the firſt clauſe of the paragraph in the text. As to the other ſubdiviſions of it, they have been almoſt as little attended to as thoſe of the former claſs. They are indeed often mentioned by writers on agriculture; but in such a vague and desultory manner as to convey no determinate idea whatever to those who attend to the subject when they read. A few experiments and observations relative to this head occur in the Essays relating to agriculture, so often quoted already. See Essay VI. part ii. § 21, 40, and 41. See also disquisitions 8, 26. to 31. and 40; 24th ditto, Vol. II.

H.

(This note refers to page twentieth.)

LITTLE occurs relating to this subject in books. Some jarring experiments that ought naturally to direct the attention towards it, do indeed sometimes occur; but these have hitherto rather been the source of cavilling and abuse than of real information.

I.

(This note refers to page twenty-first.)

THE MOST complete set of observations relative to this subject that I have seen, occurs in Mr Marshall's minutes of agriculture lately published. This branch of agriculture has been purposely neglected by writers in general, because it exhibits a painful detail of displeasing incidents, and because no one can write plausibly upon it who is ignorant of practice; which is far from being the case in many other branches of this science.

K.

(This note refers to page twenty-fourth.)

ALL THIS is supposing that the kind of graſs treated of yielded seeds in abundance, and continued to do so for many years without failing: which is but seldom the case. Where the seeds are scanty, or where they become more difficult to save after a year or two, the difficulties above enumerated would be greatly encreased.

THE WRITER of this essay has himself experienced these difficulties; on which account he has not been able to push his discoveries on grasses nearly so far as some who may not have adverted to these particulars might expect. Hope is eager and sanguine; but slow is the progreſs of experience.

L.

(This note refers to page twenty-fourth.)

IF THE experiment related to any kind of grain, this circumstance becomes extremely troublesome, as it is hardly possible to fence it from the birds of the air. This has been strongly felt by almost every experimenter in modern times; which has given but too much scope for the imagination to supply the deficiency occasioned by these means.

M.

(This note refers to page twenty-sixth.)

THE CIRCUMSTANCES mentioned in the text will perhaps appear so discouraging as to prevent individuals from attempting any experiments of this kind. To remove that impreſsion, it is proper to observe, that although all the particulars above enumerated are strictly neceſsary where *certainty* is required; yet, as much benefit may be derived from experiments of this kind even when they can go no farther than to afford a probable *gueſs*, every one ought to exert himself as much as he can to do what comes within his power in this line, although it does not amount to what we could wish for. This country has reaped much benefit from the culture of clover and rye-graſs, although we are still far from having attained the requiſite degree of *certainty* with regard to these.

N.

(This note refers to page thirtieth.)

BECAUSE it is only by comparing similar experiments upon soils seemingly alike, and contrasting the different results with one another, that we can ever be enabled to discover those latent characteristics that must be employed by the farmer to distinguish the soils from one another. Before the chemist can employ many substances in experiments or arts, he must ascertain them by certain tests applied to them; and in like manner before the farmer can claſs his soils properly, he must perhaps try their effects in rearing certain plants, *&c.*

O.

(This note refers to page thirty-ninth.)

SUCH attempts, however, have been made; but all of them have miscarried, for the reasons alledged in the text. The Museum Rusticum, as the most judicious work of this kind, kept it ground for a few years; which, although conducted by men who evidently had no knowledge in agriculture, and in whom the public could have little confidence, contains many ingenious and useful essays, and affords a most convincing proof of the benefits that might result from a work of the kind here proposed, while at the same time it ought to afford a caveat to enterprising booksellers not to attempt a thing of the same kind but under the direction of a person *properly* qualified for the task: and such a perſon, it is probable, will never come under the power of booksellers. If ever such a work is undertaken, it must originate with persons in a higher sphere, and be conducted upon a more liberal plan than any thing that could be expected from that quarter. A modern performance of the same nature scarce deserves to be mentioned.

P.

(This note refers to page forty-sixth.)

AS AN example of the benefit that might be derived from this communication of knowledge, I ſhall just observe, that although the practice of paring and burning ground has been long practised in Yorkshire, Devonshire, and some other counties of England; in which places the advantage and inconveniencies of that mode of culture must be well known, yet in most other parts of the island this has never been practised; so that those who might be benefited by it do not know what are the cases in which it would be most useful, or in what manner the ground ought to be afterwards treated so as to yield the greatest profit to the farmer.

ON THE other hand, the method of spreading a sheet of running water over the surface of a field of ground, and of thus encreasing its fertility, is well understood in some of the northern parts of Scotland, though it is not at all known to the inhabitants of other parts of the country, who on this account are unable to avail themselves of the advantages of their situation, to the no small loſs of the public. Full descriptions of these and other local practices of a similiar nature could not fail of being very generally beneficial.

Q.

(This note refers to page forty-sixth.)

THIS circumstance is of more importance than it may at first sight appear of to the reader. It often happens that men who are extremely curious with regard to any particular that promises to be of great public utility, live at a distance from merchants, and are altogether unacquainted with any one who could facilitate the obtaining any particular produce from a distance. If such men, in spite of these difficulties, attempt to obtain these products, after infinite delays, and many obligations to numberleſs persons with whom they are nowise connected, and perhaps a very heavy charge, they usually obtain only apologies for want of succeſs: or perhaps, from the unskilfulneſs of those employed, either obtain a thing they were not wanting, or have it spoiled before it arrives. On the other hand, curious persons who bring over ſpecimens of useful plants, or animals from distant countries, not having opportunities of rearing or cultivating these themselves, commit them to the care of such persons as they meet with, who often neglect or lose them. But should the author of a work of the kind here proposed undertake the task, to him all curious foreign plants or animals might be transmitted, and to him might be addressed all enquiries or commissions about foreign products; by which means, in the first place no valuable production would be lost; and in the next place, correspondents abroad might be instructed what to send, and navigators informed of the most proper method of preserving such articles so as to bring them safe to this country.

THE END.

B L